

X28TC256 TURBO Charged (Burst Mode) E²PROM

**High Performance, TURBO Access Time,
5V Operation**

Full Featured CMOS E²PROM

FEATURES/APPLICATIONS:

- 32k x 8 Burst Mode Full Featured E² PROM designed for use with today's High Performance RISC Architecture Processors such as the Cypress CY7C601 or the AMD AM29000.
- High Speed Interpage Access Time: 35 NS
- Low Power CMOS Process: ISB (CMOS) = 500 μ A
- SDP (Software Data Protect)
- Applications Environments:
 - AT: Replacing EPROM + RAM to reduce chip count.
 - Workstations: Systems Information Storage.

68HC11

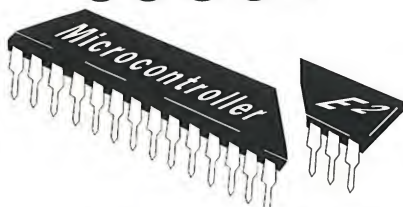


**Low Cost, Your 68HC11 + Our 64K Bits Of E²PROM
5 Volt, Single-Chip, Nonvolatile Memory Solutions
For The 68HC11 Family**

X68C64 FEATURES:

- Organized 8K X 8
- Simultaneous Software Execution While Writing
- Multiplexed Address/Data Bus
- High Performance Low Power CMOS
- Software Data Protection
- Block Protection
- Toggle Bit Early End Of Write Detection
- 32 Byte Page Mode Write

80C51

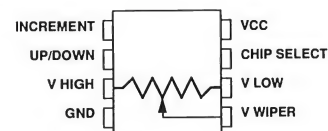


**Low Cost, Your 80C51 + Our 64K Bits Of E²PROM
5 Volt, Single-Chip, Nonvolatile Memory Solutions
For The 80C51 Family**

X88C64 FEATURES:

- Organized 8K X 8
- Simultaneous Software Execution While Writing
- Multiplexed Address/Data Bus
- High Performance Low Power CMOS
- Software Data Protection
- Block Protection
- Toggle Bit Early End Of Write Detection
- 32 Byte Page Mode Write

"NO KNOBS"



E2POT™ Digitally Controlled Potentiometers

FEATURES:

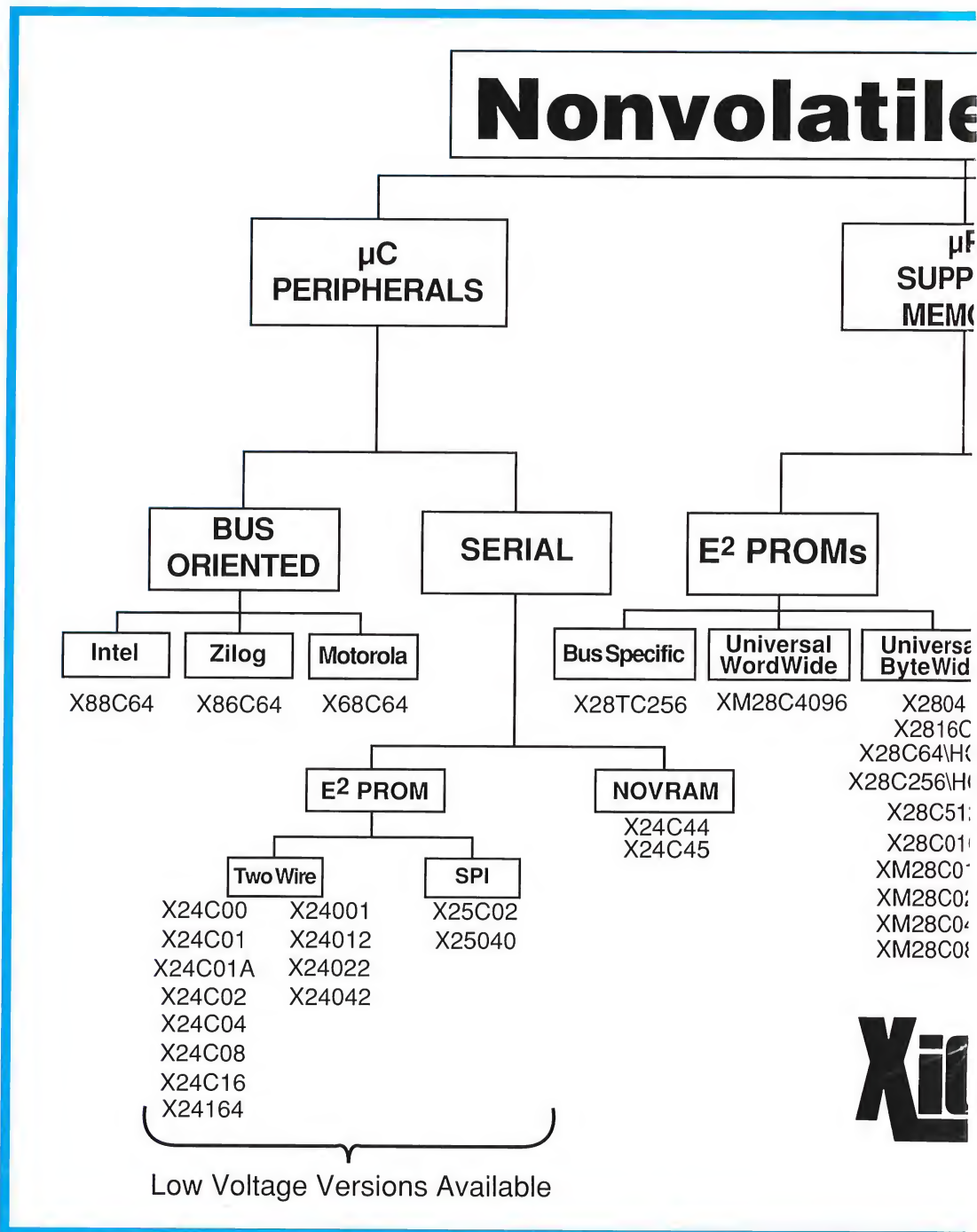
- Low Power CMOS Technology
- Non-volatile Wiper Position Storage
- Temperature Compensated
- Low Cost
- $\pm 20\%$ End To End Resistance Range
- Improve System Reliability
- 1-3% Resolution
- 100 Year Wiper Position Retention
- Will Not Wear Out!
- Allow Automated System Adjustments
- 8 Pin Through-hole And Surface Mount Packages

XICOR NONVOLATILE MEMORY OVERVIEW

Today's electronic products, from compact disc players to the most sophisticated computer systems, have one major shortcoming. When the power is disconnected or lost, they "forget." They forget valuable stored information and programming that often took hours to input. Problems resulting from this electronic amnesia can be as simple as having to re-set clocks and programming on a VCR, or as complex as regenerating critical software code.

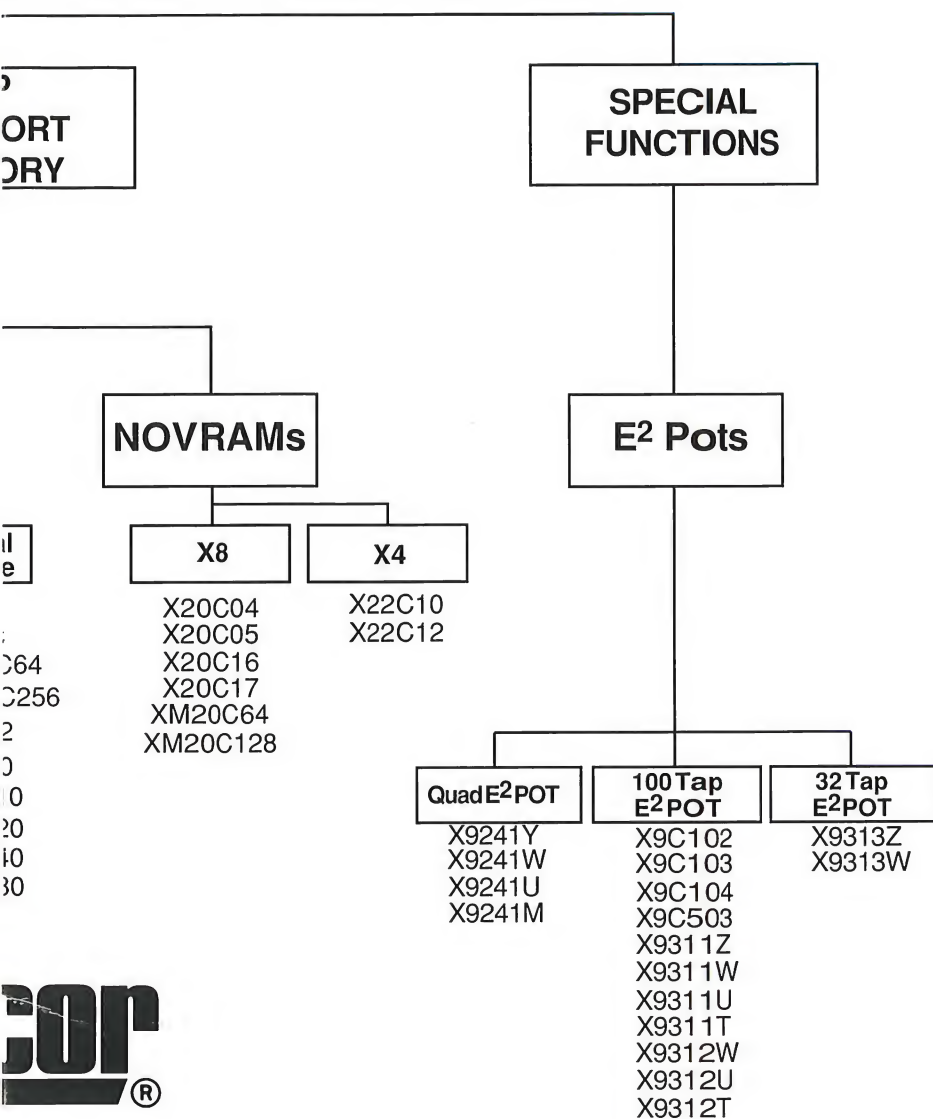
Xicor's nonvolatile semiconductor technology provides an excellent solution to this frustrating problem. By using Xicor products in electronic devices, engineers around the world are now incorporating "unforgettable" memory storage into products used by consumers and businesses everyday.

The basic building blocks of every electronic system fall into two categories, microcontrollers that perform specific tasks as single-chip solutions, and microprocessors that provide the calculating power for today's computers.



Xicor nonvolatile memory products work side by side with both microcontrollers and microprocessors to deliver the performance and longevity users require from these systems.

Special Solutions



Xicor's unique line of non-volatile devices is divided into three product families.

Microprocessor Support Memory

The Microprocessor Support Memory family consists of nonvolatile memory devices designed to interface to a wide variety of microprocessors. There are two basic types of memory devices called NOVRAMS and E²PROMS, and they are organized in standard nibble-wide, byte wide and wordwide configurations.

Microcontroller Peripherals

Xicor's wide range of Microcontroller Peripherals integrate nonvolatile storage with additional functionality optimized for minimum chip count microcontroller based systems.

Bus oriented E²PROMs are used for external program and data storage, while the serial devices minimize the interconnection hardware overhead. Devices are based upon either E²PROM or NOVRAM architectures and are optimized for the particular microcontroller architecture.

Special Function Line

Xicor's Special Function devices, consist of the popular E²Potentiometers which are semiconductor replacements for the familiar mechanical pots used throughout the industry. This family of potentiometers will store the pot's wiper position on demand and recall it when needed. The pots, which are available in a variety of standard resistance values, and voltage ranges can be incremented and decremented over the entire resistance range in 100, 64, or 32 step increments. The Quad E²Pot family offers four 64 step potentiometers in one package.

MICROCONTROLLER PERIPHERALS

SERIAL E²PROMS

DEVICE	BIT DENSITY	ORG.	CLOCK RATE	PACKAGE D P S			NO. PINS 8 14	TEMP. RANGE COM IND MIL			SUPPLY VOLTAGE 5 3 2.7			FEATURES
X24C00	128	X8	1MHZ		◆	◆	◆	◆	◆	◆	◆	◆		TWO WIRE INTERFACE
X24001	128	X8	1MHZ		◆	◆	◆	◆	◆	◆	◆	◆		TWO WIRE INTERFACE 12 ONLY VOLT PROGRAMMING
X24C01	1K	X8	100KHZ		◆	◆	◆	◆	◆	◆	◆	◆	◆	TWO WIRE INTERFACE
X24C01A	1K	X8	100KHZ		◆	◆	◆	◆	◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS
X24012	1K	X8	100KHZ		◆	◆	◆	◆	◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS PIN 7 = NO CONNECT
X24C02	2K	X8	100KHZ	◆	◆	◆	◆	S	◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS
X24022	2K	X8	100KHZ		◆	◆	◆		◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS PIN 7 = NO CONNECT
X25C02	2K	X8	1MHZ	◆	◆	◆	◆		◆	◆	◆	◆	◆	SPI, SSI INTERFACE
X24C04	4K	X8	100KHZ	◆	◆	◆	◆	S	◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS
X24042	4K	X8	100KHZ		◆	◆	◆		◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS PIN 7 = NO CONNECT
X25040	4K	X8	1 MHZ	◆	◆	◆	◆		◆	◆	◆	◆	◆	SPI, SSI INTERFACE BLOCK PROTECTION
X24C08	8K	X8	100KHZ		◆	◆	◆		◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS
X24C16	16K	X8	100KHZ	◆	◆	◆	◆	S	◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS
X24164	16K	X8	100KHZ	◆	◆	◆	◆		◆	◆	◆	◆	◆	TWO WIRE INTERFACE, SLAVE ADDRESS WITH DEVICE ADDRESSING

S= SOIC package

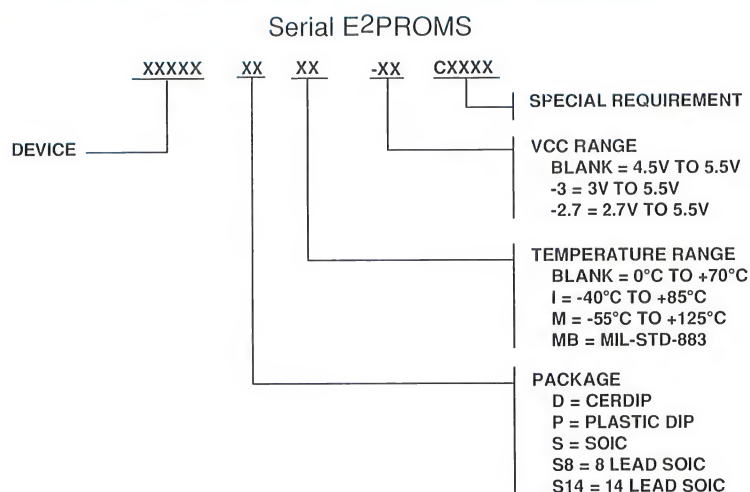
SERIAL NOVRAMS

DEVICE	BIT DENSITY	ORG.	CLOCK RATE	PACKAGE D P S			NO. PINS	TEMP. RANGE COM IND MIL			SUPPLY VOLTAGE 5 3 2.7			FEATURES
X24C44	256	X16	1MHZ	◆	◆	◆	8	◆	◆	◆	◆			NONVOLATILE STATIC RAM
X24C45	256	X16	1MHZ	◆	◆	◆	8	◆	◆	◆	◆			NONVOLATILE STATIC RAM WITH AUTOSTORE

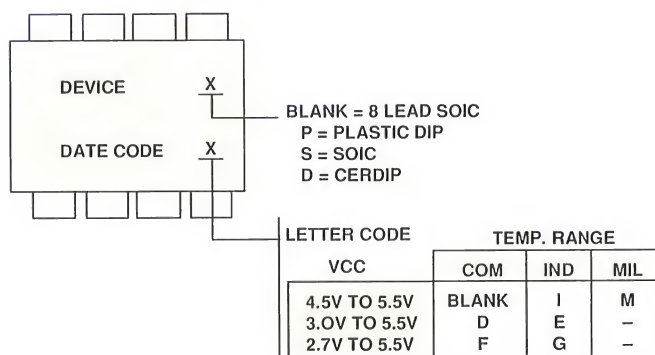


Blue lettering indicates new product

SERIAL E² ORDERING INFORMATION



SERIAL E² MARK CONVENTION



BUS ORIENTED MICROCONTROLLER PERIPHERALS

DEVICE	BIT DENSITY	ORG.	ACCESS TIME	PACKAGE D P S	NO. PINS	TEMP. RANGE COM IND MIL	SUPPLY VOLTAGE	FEATURES
X68C64	64K	X8	120 NS	◆ ◆ ◆	24	◆ ◆ ◆	5V	DUAL PLANE, CONCURRENT READ & WRITE MOTOROLA 68XX INTERFACE
X86C64	64K	X8	120 NS	◆ ◆ ◆	24	◆ ◆ ◆	5V	DUAL PLANE, CONCURRENT READ & WRITE ZILOG 86XX INTERFACE
X88C64	64K	X8	120 NS	◆ ◆ ◆	24	◆ ◆ ◆	5V	DUAL PLANE, CONCURRENT READ & WRITE INTEL 88XX INTERFACE



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APPLICATIONS SUPPORT FOR XICOR'S SERIAL MEMORIES

Xicor's serial memory products are typically interfaced to single chip microcontrollers. The interface can be implemented with an on-board serial port or through general purpose I/O lines. Both approaches require software to implement an interface.

In order to better assist our customers, the Applications Department has developed several examples of interfaces between Xicor's serial memories and different microcontrollers. These examples describe both the hardware and software required to communicate with our serial memory devices. The interfaces which have been developed can significantly reduce the amount of time required to design-in a serial memory.

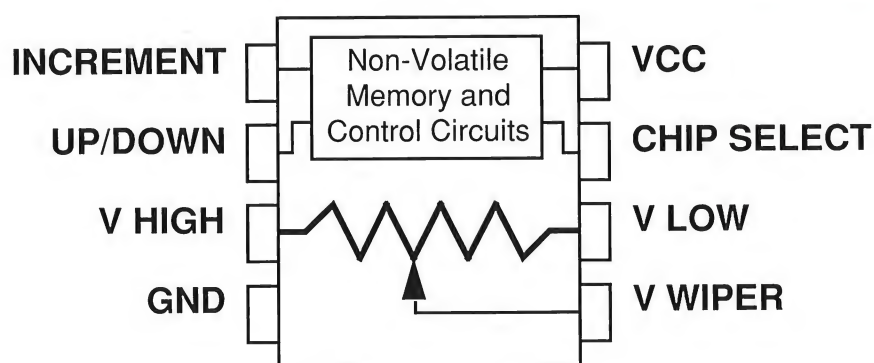
The Table below outlines some of these interfaces. Additional interfaces are in development, and copies of the latest software listings and schematics are available through Xicor's Distributors, Representatives, and Sales Offices. Since our customers are in the best position to know what interfaces are needed by the marketplace, we would be happy to hear suggestions from them for future interfaces.

The software listings mentioned above are also available for U.S. customers through the Xicor Applications Bulletin Board Service (BBS) by calling (800) 258-8864 (2400 baud, NO Parity, 8 Bits Data, 1 Stop-Bit).

μC Family Device Type	8051	68HC11	68HC05	6803	Z8
Serial Two-Wire	X24C00 - 16 x 8 X24C01 - 128 x 8 X24C02 - 256 x 8 X24C04 - 512 x 8 X24C08- 1024 x 8 X24C16- 2048 x 8	X24C00 - 16 x 8 X24C01 - 128 x 8 X24C02 - 256 x 8 X24C04 - 512 x 8 X24C08- 1024 x 8 X24C16- 2048 x 8	X24C00 - 16 x 8 X24C01 - 128 x 8 X24C02 - 256 x 8 X24C04 - 512 x 8 X24C08- 1024 x 8 X24C16- 2048 x 8	X24C00 - 16 x 8 X24C01 - 128 x 8 X24C02 - 256 x 8 X24C04 - 512 x 8 X24C08- 1024 x 8 X24C16- 2048 x 8	X24C00 - 16 x 8 X24C01 - 128 x 8 X24C02 - 256 x 8 X24C04 - 512 x 8 X24C08- 1024 x 8 X24C16- 2048 x 8
Serial SPI		X25C02 - 256 x 8	X25C02 - 256 x 8		
Serial NOVRAM	X24C44 - 16 x 16 X24C45 - 16 x 16 AutoStore™	X24C44 - 16 x 16 X24C44 - (SPI PORT) X24C45 - 16 x 16 AutoStore™	X24C44 - 16 x 16 X24C44 - (SPI PORT) X24C45 - 16 x 16 AutoStore™	X24C44 - 16 x 16 X24C45 - 16 x 16 AutoStore™	X24C44 - 16 x 16 X24C45 - 16 x 16 AutoStore™

SPECIAL FUNCTION PRODUCTS

CMOS DIGITALLY CONTROLLED POTENTIOMETERS, E ² POTS											
DEVICE	RESISTANCE (OHMS)	CLOCK SPEED.	PACKAGE D P S			NO. PINS	TEMP. RANGE COM IND MIL			SUPPLY VOLTAGE	FEATURES
X9C102	1K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, -5V TO +5V
X9C103	10K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, -5V TO +5V
X9C503	50K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, -5V TO +5V
X9C104	100K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, -5V TO +5V
X9311Z	1K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO +10V
X9311W	10K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO +10V
X9311U	50K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO +10V
X9311T	100K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO +10V
X9312W	10K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO 15V
X9312U	50K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO 15V
X9312T	100K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	100 STEP, 0V TO 15V
X9313Z	1K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	32 STEP, -5V TO +5V
X9313W	10K	250KHZ	◆	◆	◆	8	◆	◆	◆	5V	32 STEP, -5V TO +5V
X9241M	2K, 10K, 10K, 50K	250KHZ	◆	◆	◆	20	◆	◆	◆	5V	QUAD, DIRECT POSTION READ AND WRITE 2 WIRE BUS
X9241Y	2K, 2K, 2K, 2K	250KHZ	◆	◆	◆	20	◆	◆	◆	5V	QUAD, DIRECT POSTION READ AND WRITE 2 WIRE BUS
X9241W	10K, 10K, 10K, 10K	250KHZ	◆	◆	◆	20	◆	◆	◆	5V	QUAD, DIRECT POSTION READ AND WRITE 2 WIRE BUS
X9241U	50K, 50K, 50K, 50K	250KHZ	◆	◆	◆	20	◆	◆	◆	5V	QUAD, DIRECT POSTION READ AND WRITE 2 WIRE BUS



X9CMME E²Potentiometer Partial Block Diagram

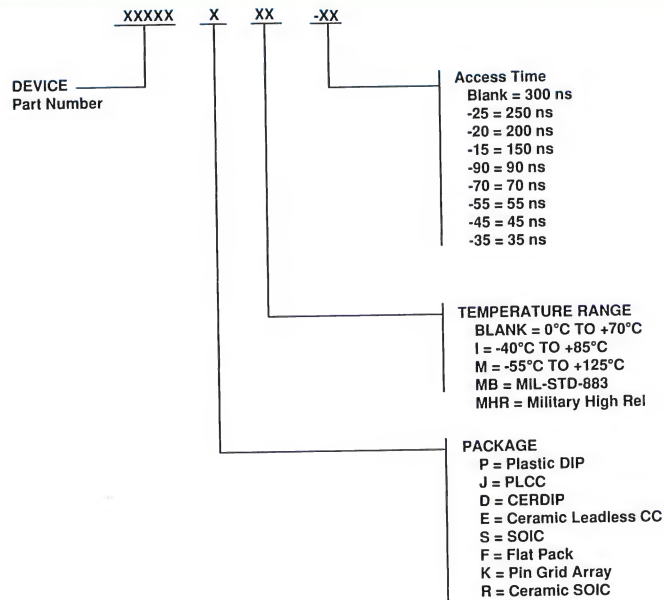
MICROPROCESSOR PERIPHERAL SUPPORT MEMORIES

PARALLEL E ² PROMS												
PART #	BIT DENSITY	ORG.	FASTEST ACCESS TIME	PACKAGE OPTIONS, No. OF PINS								FEATURES & COMMENTS
				D	P	J	E	S	F	K		
X2804A	4K	X8	250 NS	24	24							5V, ELECTRICALLY BYTE ALTERABLE E2PROM
X2816C	16K	X8	90 NS	24	24	32	32	24				5V, ELECTRICALLY BYTE ALTERABLE E2PROM
X28HC16	16K	X8	55 NS	24	24	32						5V, HIGH SPEED, BYTE ALTERABLE CMOS E2PROM
X2864	64K	X8	70 NS	28	28	32	32					5V, BYTE ALTERABLE E2PROM
X28C64	64K	X8	150 NS	28	28	32	32	28	28	28		5V, BYTE ALTERABLE CMOS E2PROM
X28HC64	64K	X8	55NS	28	28	32	32	28	28	28		5V, HIGH SPEED, BYTE ALTERABLE CMOS E2PROM
X28C256	256K	X8	150 NS	28	28	32	32	28	28	28		5V, HIGH SPEED, BYTE ALTERABLE CMOS E2PROM
X28HC256	256K	X8	70 NS	28	28	32	32	28	28	28		5V, HIGH SPEED, BYTE ALTERABLE CMOS E2PROM
X28VC256	256K	X8	45 NS	28	28	32	32	28	28	28		5V, VERY HIGH SPEED, BYTE ALTERABLE CMOS E2PROM
X28TC256	256K	X8	30 NS	32	32		32					5V, TURBO (BURST MODE), HIGH PERFORMANCE.
X28C512	512K	X8	120 NS	32	32	32	32		32	36		5V, BYTE ALTERABLE, CMOS E2PROM
X28C513	512K	X8	120 NS			32	32					256K TO 512K PLCC AND LCC UPGRADE PATH
X28C010	1 MEG	X8	120 NS	32	32	32	32		32	36		5V, BYTE ALTERABLE, CMOS E2PROM
XM28C010	1 MEG	X8	120 NS	32								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM
XM28C020	2 MEG	X8	200 NS	32								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM
XM28C040	4 MEG	X8	200 NS	32								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM
XM28C4096	4 MEG	X16	150 NS	40								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM
XM28C080S	8 MEG	X8	180 NS									STANDARD 36 PIN SRAM SIP PINOUT
XM28C010 FR	1 MEG	X8	120 NS	32								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM
XM28C020 FR	2 MEG	X8	200 NS	32								5V, HIGH SPEED BYTE ALTERABLE CMOS E2PROM



Blue lettering indicates new products

PARALLEL E²PROM ORDERING INFORMATION



PARALLEL NOVAMS

PART#	BIT DENSITY	ORG.	FASTEST ACCESS TIME	PACKAGE OPTIONS, No. OF PINS							FEATURES & COMMENTS
				D	P	J	E	S	F	K	
X2001	1K	X8	200 NS	24							NON VOLATILE STATIC RAM
X2004	4K	X8	200 NS	28	28	32	32				NON VOLATILE STATIC RAM
X20C04	4K	X8	150 NS	28	28	32	32				CMOS NON VOLATILE STATIC RAM
X20C05	4K	X8	35 NS	28	28	32	32				CMOS NON VOLATILE STATIC RAM & AUTOSTORE
X20C16	16K	X8	35 NS	28	28	32	32				HIGH SPEED CMOS NON VOLATILE STATIC RAM & AUTOSTORE
X2210	256	X4	250 NS	18	18						NIBBLE WIDE NON VOLATILE STATIC RAM
X22C10	256	X4	120 NS	18	18			16			CMOS NIBBLE WIDE NON VOLATILE STATIC RAM
X2212	1K	X4	250 NS	18	18						NIBBLE WIDE NON VOLATILE STATIC RAM
X22C12	1K	X4	150 NS	18	18						CMOS NIBBLE WIDE NON VOLATILE STATIC RAM
XM20C64	64K	X8	55NS	28							HIGH SPEED NOVAM; FULL MILITARY TEMPERATURE RANGE
XM20C64FR	64K	X8	55NS	28							HIGH SPEED NOVAM; TWO TEMP RANGES: COMMERCIAL AND INDUSTRIAL TEMPERATURE RANGE, FR-4 SUBSTRATE
XM20C64S	64K	X8	55NS								INDUSTRY STANDARD RAM; 36 PIN SIP
XM20C128S	128K	X8	55NS								INDUSTRY STANDARD RAM; 36 PIN SIP

All of the preceeding products are available across commercial, industrial, and military temperature ranges.

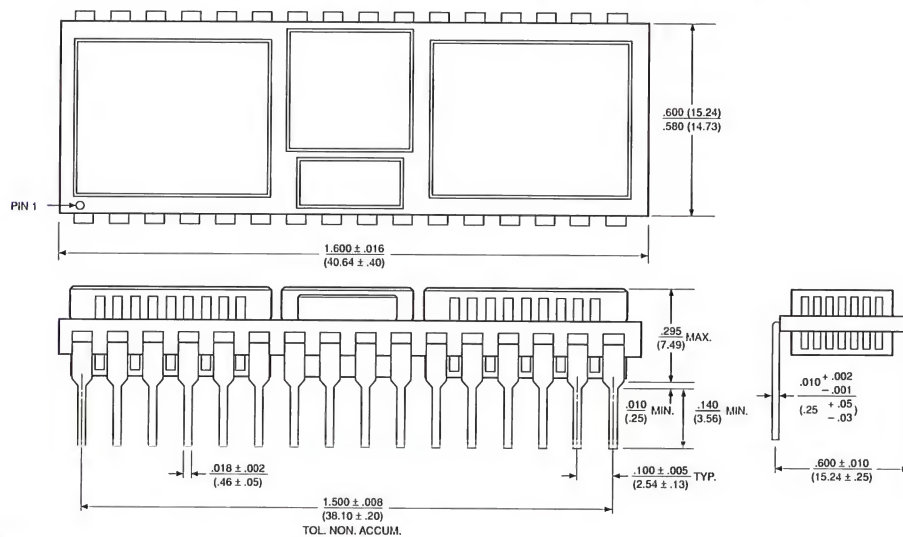


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MEMORY MODULES

P/N	CONFIG	PIN #	PKG	SUBSTRATE	TEMP RANGES			BASE COMPONENT	QTY PER
					C/I	M	HR		
XM28C010	128K X 8	32	DIP	CERAMIC	X	X	X	X28C256E	4
XM28C020	256K X 8	32	DIP	CERAMIC	X	X	X	X28C513E	4
XM28C040	512K X 8	32	DIP	CERAMIC	X	X	X	X28C010E	4
XM28C4096	256K X 16	40	DIP	FR-4	X			X28C010F	4
XM28C080S	1M X 8	36	SIP	FR-4	X			X28C010F	8
XM28C010 FR	128K X 8	32	DIP	FR-4	X			X28C512J	2
XM28C020 FR	256K X 8	32	DIP	FR-4	X			X28C512J	4
XM20C64	8K X 8	28	DIP	CERAMIC	X	X	X	X20C16E	4
XM20C64FR	8K X 8	28	DIP	FR-4		X		X20C16J	4
XM20C64S	8K X 8	36	SIP	FR-4		X		X20C16J	4
XM20C128S	16K X 8	36	SIP	FR-4		X		X20C16J	8
XM28C010P	32K X 32	66	PGA	CERAMIC	X	X	X	X28VC256E	4
XM28C020P	64K X 32	66	PGA	CERAMIC	X	X	X	X28C512E	4
XM28C040P	128K X 32	66	PGA	CERAMIC	X	X	X	X28C010E	4

32-PIN DUAL-IN-LINE PACKAGE CERAMIC LEADLESS CHIP CARRIERS AS USED IN SOME XICOR MODULES



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MILITARY PRODUCTS INFORMATION

MIL-STD-883 PRODUCT LISTING							
XICOR PART NUMBER	ORGANIZATION	FASTEST SPEEDS*	CERDIP	LCC	FLAT PACK	PGA	SMD #
NOVRAMS							
X22C10	64 X 4	120NS	18				TBD
X22C12	256 X 4	120NS	18				TBD
X20C04	512 X 8	200NS	28	32			TBD
X20C05	512 X 8	35NS	28	32			TBD
X20C16	2K X 8	35NS	28	32			TBD
SERIAL NOVRAMS							
X24C44	16 X 16	1 MHZ	8				TBD
X24C45	16 X 16	1 MHZ	8				TBD
SERIAL E ² PROMS							
X24C02	256 X 8	100 KHZ	8				TBD
X24C04	512 X 8	100 KHZ	8				TBD
X24C16	2K X 8	100 KHZ	8				TBD
E ² POTENTIOMETERS							
X9CMME			8				TBD
5 Volt, BYTE ALTERABLE E ² PROMS							
X2816C	2K x 8	90NS	24	32			TBD
X28C64	8K x 8	150NS	28	32	28	28	5962-87514
X28HC64	8K x 8	55NS	28	32	28	28	TBD
X28C256	32K X 8	150NS	28	32	28	28	5962-88525
X28HC256	32K X 8	70NS	28	32	28	28	5962-88634
X28TC256	32K X 8	35NS	28	32			TBD
X28C512	64K X 8	120NS	32	32	32	36	5962-90869
X28C513	64K x 8	120NS		32			5962-90869
X28C010	128K X 8	120NS	32	32	32	36	5962-38267
MICROCONTROLLER PERIPHERAL MEMORY							
X88C64	8K X 8	120NS					TBD

* Speeds for parallel access devices is minimum tAA in NS; for serial devices speed is maximum clock rate in Hz.



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